BGWBF
3.1
6/1/07

PRELIMINARY UPLAND ASSESSMENT WORK PLAN
MCCONKEY/SESKO SITE
BREMERTON, WASHINGTON

JUNE 1, 2007

FOR
CITY OF BREMERTON

641760

GEOENGINEERS

June 1, 2007

City of Bremerton
Department of Public Works
3027 Olympus Drive
Bremerton, WA 98130

Attention: Mr. Dan Miller

We are pleased to submit two copies of the Final Draft of our "Preliminary Upland Assessment Work Plan" for the McConkey/Sesko Site located in Bremerton, Washington. The site work was initiated on May 21, 2007 based on the electronic approval received from the U.S. Environmental Protection Agency on May 16, 2007. We appreciate the opportunity to be of service to you. Please contact us if you have questions regarding information presented in this work plan.

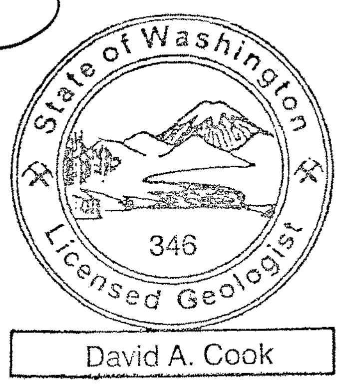
Yours very truly,

GeoEngineers, Inc.

Sean P. Trimble, LG

Senior Project Manager

David A. Cook, LG, RBP
Principal



SPT:DAC:bmw
Seat:\P:\0\0892017\00\Finals\00892017FinalWPSapQapp.doc

cc. Joanne LaBaw, U.S. Environmental Protection Agency – Region 10
Washington State Department of Ecology Voluntary Cleanup Program

Disclaimer: Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Approval Page
Preliminary Upland ~~Remedial Investigation~~ Assessment Work Plan
McConkey/Sesko Site
Bremerton, Washington

Prepared by:

GeoEngineers, Inc.
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
(206) 728-2674

____________________ Date 5/30/2007
Sean P. Trimble, L.G.
GeoEngineers Senior Project Manager

____________________ Date 5/30/07
David A. Cook, L.G., R.B.P., Principal
GeoEngineers Project Quality Assurance Officer

____________________ Date 5/31/07
Dan Miller
City of Bremerton Department of Public Works & Utilities Project Manager

____________________ Date 5/21/07
Joanne LaBaw
U.S. EPA Project Manager Approval

____________________ Printed Name Donald Matheny, Date 5/24/07
Pending
U.S. EPA QA Officer Approval

TABLE OF CONTENTS

List of Figures

APPENDICES

PRELIMINARY UPLAND ASSESSMENT WORK PLAN
MCCONKEY/SESKO BROWNFIELD SITE
BREMERTON, WASHINGTON

1.0 INTRODUCTION

This work plan summarizes the preliminary sampling and analysis activities associated with the planned upland assessment of the McConkey/Sesko Site (herein referred to as the "Site") located at 1725 Pennsylvania Avenue in Bremerton, Kitsap County, Washington. The location of the Site relative to surrounding physical features is shown on Figure 1. The general layout of the Site is shown on Figure 2.

The Washington Department of Ecology ("Ecology") has given the Site a priority ranking of "1" using the Washington Ranking Method (WARM), indicating the greatest assessed risk of potential impacts to public health and the environment. We understand the City of Bremerton and one or more of the current Site owners are considering cleanup and redevelopment of the Site.

The City of Bremerton was the recipient of an EPA Brownfields Assessment Grant (EPA Project No. BF-9604651-0) for this Site in 2006. EPA has also offered to conduct a Targeted Brownfields Assessment (TBA) at the Site. Based on earlier meetings between the City, EPA, the property owners and other stakeholders, it was decided that the best way to maximize the EPA assessment grant and TBA was for GeoEngineers to complete an initial assessment at areas of highest concern, including groundwater. Once results are known, the EPA will complete the TBA focusing on delineating soil and groundwater contamination in the upland portion of the Site.

The City of Bremerton intends to enter this Site into Ecology's Voluntary Cleanup Program (VCP). Ecology will be the lead regulatory agency and will review and comment on documents and will provide technical support, and ultimately, an opinion through the Voluntary Cleanup Program.

This Work Plan presents the project objectives, scope of work and schedule for completing initial site characterization activities at the Site. The objectives of the investigation activities are to characterize the soil and groundwater in potential source areas identified during previous studies conducted at the Site. Soil and groundwater samples will be obtained from groundwater monitoring well borings constructed in the upland portion of the Site during this study and submitted for chemical analysis.

1.1 WORK PLAN ORGANIZATION

The rationale and scope of work for the investigation activities to be performed are outlined in the body of this Work Plan. The following appendices are also included:

- Appendix A – Sampling and Analysis Plan
- Appendix B – Quality Assurance Project Plan
- Appendix C – Health and Safety Plan
- Appendix D – Report Limitations and Guidelines for Use
- Appendix E – Consent for Access to Property

The Quality Assurance Project Plan has been prepared in accordance with the document entitled "*Quality Assurance Guidance for Conducting Brownfield Site Assessments*" prepared by the U.S. Environmental Protection Agency (EPA, 1998).

1.2 PROJECT OBJECTIVES

The objectives of the preliminary assessment described herein include:

- To assess soil and shallow groundwater quality in potential contaminant source areas that have been identified in previous studies; and
- To evaluate and transmit data gathered during the preliminary investigation in order to develop a scope of work for additional investigation activities required at the Site (i.e. the TBA).

2.0 BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The Site is comprised of tax parcel numbers 3711-000-001-0409-0607 (McConkey parcels) and tax parcel number 3711-000-022-0101 (Sesko parcel). The Site is located at 1725 Pennsylvania Avenue approximately one mile north-northwest of downtown Bremerton and immediately south of Port Washington Narrows in Bremerton, Kitsap County, Washington. The Site is bounded by Thompson Drive to the west, Pennsylvania Avenue and residential properties to the east, the Port Washington Narrows waterway to the north, and a third McConkey-owned parcel to the south.

The Site is comprised of three tax parcels totaling approximately 3.7 acres. Two of the parcels are currently owned by Paul and Margaret McConkey. The third parcel is currently owned by Natacha Sesko. The City of Bremerton has an easement for the City's storm drain within the Site boundary and a Right-of Way adjacent to the east of the Sesko parcel. Several warehouse structures are present on the Site, which is currently used for light industrial purposes and storage of various materials, including boat parts and metal debris. According to the Phase I Environmental Site Assessments (ESAs) prepared by TechLaw, Inc. for the Site, each of the tax parcels is zoned as "Marine Industrial."

As described in Section 2.2, the available historical information indicates the Site has an extensive history of industrial use. The most notable historical industrial occupants include a coal gasification plant, petroleum bulk storage and distribution plant, sheet metal fabricator, drum storage facilities, boat and vehicle repair facilities, sandblasting and painting operation, and salvage yard. A concrete manufacturing plant was formerly located off-Site to the south. A petroleum bulk storage facility currently is located adjacent to the east of the north portion of the Site, and a vacant former petroleum bulk storage facility is located west of the north portion of the Site.

2.2 SITE HISTORY

Limited historical information is available for the Site. Our understanding of Site history generally is based on our review of (1) the Phase I ESAs prepared by TechLaw, Inc. for the Site, (2) a Phase I Environmental Audit report prepared by Environmental Associates, Inc. (EA) in 1997 for the middle McConkey parcel, (3) Ecology's files for the Site, (4) a title report by Land Title Company (2003) for portions of the McConkey parcels and (5) interviews with Trip McConkey, current manager of the McConkey-owned parcels. We also reviewed information in our project files pertaining to the adjacent fuel bulk plant facility located east of the Site.

2.2.1 *Coal Gasification Plant*

The northern portion of the Site, including portions of the north and middle McConkey parcels and Sesko parcel, was occupied by a coal gasification plant from about the 1920s to the 1970s. Owners of the gas plant included Western Gas Company and later Cascade Natural Gas. The gas plant included approximately 17 petroleum above ground storage tanks (ASTs) which have since been removed. Information pertaining to the presence or status of underground storage tanks (USTs) associated with the former gas plant has not been identified. The remaining gas plant above-ground facilities were removed by the 1980s, and the area reportedly has been used for miscellaneous storage and boat repair activities since.

2.2.2 Petroleum Bulk Storage and Distribution Plant

A petroleum bulk storage and distribution plant formerly was located on a portion of the Sesko parcel from about the 1920s to 1980s. The former petroleum bulk plant was previously owned and operated by Western gas Company of Washington and Lent, Blomberg, & Lent. The petroleum bulk plant included at least ten ASTs and two unloading racks which have since been removed. Information pertaining to the presence or status of underground storage tanks (USTs) associated with the former petroleum bulk plant has not been identified. An underground fuel pipeline (now abandoned) reportedly connected the petroleum bulk plant facilities on the Site and adjacent properties to the east and west to a fuel dock formerly located on the north portion of the Site. Based on information from Trip McConkey we understand that Mr. Sesko (now deceased) removed portions of the petroleum piping associated with the former fuel dock and an abandoned UST (located immediately to the west of the bulk plant) in the 1980s or 1990s. This area reportedly has been used for miscellaneous storage/salvage yard activities since.

2.2.3 Industrial Park

The current buildings on the middle McConkey parcel were constructed as part of an industrial park owned by Lents, Inc. from about the 1920s to 1980s. The industrial park generally was occupied by sheet metal, plumbing and electrical service manufacturing facilities during this time. At least four of the buildings are believed to have utilized heating oil systems, and the status or the associated storage tanks is not known. The industrial park has since been occupied by several industrial facilities, including a sheet metal fabricators, drum storage facilities, vehicle repair facilities, and a sandblasting and painting operation.

2.2.4 Adjacent Concrete Manufacturing Plant

A concrete manufacturing plant formerly was located on the south McConkey parcel from at least the 1960s to 1990s. Owners of the concrete plant included CB Concrete Products. This facility reportedly also was used as a drum storage area. This area reportedly has been used for covered boat storage, construction offices and miscellaneous storage since.

2.2.5 Adjacent Petroleum Bulk Plant Property

GeoEngineers was involved with UST removal and groundwater monitoring activities at the adjacent petroleum bulk plant property to the east of the north portion of the Site for the former property owner (Tosco). The adjacent property is included on the Confirmed or Suspected Contaminated Sites List (CSCSL) based on petroleum-related soil and groundwater identified on that property. The former Tosco bulk fuel facility is now owned and operated by SC Fuels.

2.3 SITE SUBSURFACE CONDITIONS

2.3.1 General

Our understanding of Site subsurface conditions is based on our review of (1) the Phase I ESAs prepared by TechLaw, Inc. for the Site, (2) the Phase I Environmental Audit report prepared by EA in 1997 for the middle McConkey parcel, (3) Ecology's files for the Site, (4) Site visits during 2006 and 2007 and (5) the

1965 Washington Division of Water Resources Water-Supply Bulletin 18, *Water Resources and Geology of the Kitsap Peninsula and Certain Adjacent Islands*. We also reviewed information in our project files pertaining to the adjacent fuel bulk plant facility located east of the Site.

2.3.2 Geology

Based on geologic setting information included in the ESA reports, the Site is (1) situated on a gently rolling elevated plain formed during glacial activities which ended about 15,000 years ago, (2) at elevations of about 40 to 50 feet above sea level, and generally slopes down toward the north where there is a steep bluff extending down to the Port Washington Narrows, and (3) likely is underlain by glacial till (a dense heterogeneous mixture of silt, sand and gravel). Based on our review of information pertaining to the adjacent bulk plant facility to the east of the Site, soil beneath the adjacent property includes silt, sand and gravel to at least 22 feet bgs.

According to the 1965 Washington Division of Water Resources Water-Supply Bulletin 18, *Water Resources and Geology of the Kitsap Peninsula and Certain Adjacent Islands*, the site lies near the center of the Puget Sound Lowland, which is situated between the Olympic Mountains to the west and the Cascade Range to the east. The Puget Sound Lowland is part of a large glacial drift plain formed by multiple glaciations over the area. This history of complex glacial erosion and deposition events, separated by long periods of nonglacial deposition, has created a very complex mixture of unconsolidated sediments beneath the area. This sediment layer ranges in thickness from zero to over 3,600 feet and overlies an irregular bedrock surface.

The geologic units in the County range in age from Tertiary to Recent. The Tertiary units include the unnamed igneous rocks that compose the Gold and Green Mountains west of Bremerton, and the younger Blakeley Formation, which consists of a thick sequence of marine and non-marine sandstone, shale, and conglomerate. The Tertiary rock units are overlain by a thick sequence of glacial and inter-glacial deposits of Pleistocene age. During the Pleistocene Epoch, the region was occupied by at least five successive continental ice sheets. The youngest of these, which receded about 15,000 years ago, was the Vashon Stade of the Fraser Glaciation. Much of the upland area in the region is mantled by a veneer of glacial till with the valleys containing predominantly glacial outwash and Recent alluvium. Nearly all of the region's groundwater is produced from these Quaternary (Recent and Pleistocene) sediments.

2.3.3 Hydrogeology

Information pertaining to specific hydrogeologic conditions beneath the Site was not was identified in the Site-related documents we reviewed. Based on our review of information pertaining to the adjacent bulk plant facility to the east of the Site, perched groundwater beneath the adjacent property has been measured at depths ranging from about 3 to 18 feet bgs, and generally flows northwest toward the Port Washington Narrows. It is not clear if shallow groundwater at the Site is influenced by tidal variations. This relationship will need to be evaluated during site assessment activities.

According to the 1965 Washington Division of Water Resources Water-Supply Bulletin 18, the majority of groundwater in the region is contained in the unconsolidated sediments. These sediments occur in a layered system of groundwater bearing units (aquifers) and low permeability units which retard groundwater flow (aquitards). Textural variability within the units likely results in a complex assemblage of interfingered aquifers and aquitards occurring on scales ranging from regional to local.

Groundwater flow within regional aquifers is predominantly horizontal, beginning at recharge areas and flowing towards discharge areas. Groundwater flow between aquifers is predominantly vertical, and typically much slower due to the lower permeability of aquitards. Throughout the region, uppermost (shallow) aquifers are commonly "perched" above aquitards and are limited in areal extent. It is likely that groundwater samples collected during the previous study of the adjacent bulk plant facility was obtained from an upper perched layer.

3.0 SCOPE OF WORK

The scope of work (SOW) described herein is designed to assess soil and shallow groundwater quality in potential contaminant source areas that have been identified in previous studies. Detailed sampling protocol and field/laboratory QA/QC are discussed in the Sampling and Analysis Plan (SAP) (Appendix A) and the site-specific Quality Assurance Project Plan (QAPP) (Appendix B). A Health and Safety Plan (HASP), prepared for use by GeoEngineers' field personnel in general accordance with Occupational Safety and Health Administration (OSHA) regulations, Washington Department of Labor and Industries standards, and Title 29 of the Code of Federal Regulations (CFR) 1910.120 and 1926, is included in Appendix C.

GeoEngineers will complete the following specific scope of services for the preliminary soil and groundwater assessment:

1. Prepare a site-specific health and safety plan to be used by GeoEngineers personnel during activities conducted at the site.
2. Conduct a site visit to mark proposed exploration locations.
3. Arrange for utilities to be located in the vicinity of the proposed explorations by public and private locating services.
4. Monitor the completion of up to eight soil explorations to depths down to 30 feet below ground surface (bgs), refusal or five feet below the initial water table, whichever occurs first. The eight soil explorations will be advanced using a truck-mounted drilling rig, equipped with hollow-stem augers (HSAs) and will be converted into permanent groundwater monitoring wells.
5. Collect soil samples from each of the soil boring explorations and screen soil samples for evidence of impact by hazardous substances using visual, headspace vapor, and water sheen screening methods.
6. Submit selected soil and groundwater samples for laboratory analysis of:
   - Gasoline- and diesel-range petroleum hydrocarbons by Methods NWTPH-Gx and NWTPH-Dx (with silica gel cleanup);
   - Volatile organic compounds (VOCs) by EPA Method 5035/8260B;
   - Semivolatile organic compounds (SVOCs) by EPA Method 8270 SIM;
   - Polychlorinated biphenyls (PCBs) by EPA Method 8082; and
   - Priority pollutant list (PPL) metals and chromium VI by EPA 6000/7000 series methods and tributyltin (TBT) by Krone (GC/MS).
7. Drum and temporarily store soil cuttings, decontamination rinse water, and monitoring well development water generated during the investigation activities on Site. GeoEngineers assumes that drummed soil and water will be disposed of during future cleanup activities.
8. Prepare and transmit soil boring logs with monitoring well construction details, data summary tables, and figures.

9. Participate in scoping meetings with the EPA as a technical resource to assist in establishing the scope for EPA's TBA.

We understand that the City of Bremerton has contracted a site boundary and topographic survey. The survey will be used as a base map for future assessment activities.

3.1 Rationale for Boring Locations

Proposed boring locations are shown on Figure 3. Table 1 summarizes the rationale for the selection of the boring locations and sample intervals for the proposed delineation activities.

4.0 PROJECT SCHEDULE

The schedule of events and anticipated completion dates are summarized in the table below.

Activity Description	Anticipated Date(s)
Prepare Final Draft Remedial Investigation Work Plan (with SAP, QAPP, and HASP) and submit to the City, EPA, and Ecology	May 10, 2007
Incorporate stakeholder comments & finalize Remedial Investigation Work Plan	May 21, 2007
Preliminary Investigation Field Activities	May 21-30, 2007
Receive chemical analytical data from laboratory	June 15, 2007
Data reduction/evaluation with results transmitted to the City, EPA, Ecology, and Stakeholders	July 20, 2007
Scoping meeting to determine additional scope of work required at Site	July 24, 2007
EPA's contractor submits SAP/QAPP for additional scope items	August 3, 2007
EPA approves contractor's SAP/QAPP for additional scope items	August 31, 2007
EPA's contractor conducts additional investigation scope	September 5-14, 2007
EPA's contractor provides summary of additional investigation results	November 5, 2007

As indicated previously, additional details related to exploration locations, soil and groundwater sampling and testing protocols are outlined in the Sampling and Analysis Plan (Appendix A).

5.0 LIMITATIONS

We have prepared this report for the exclusive use of the City of Bremerton and regulatory agencies. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix D titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

6.0 REFERENCES

Environmental Associates, Inc., 1997, *Phase I Environmental Audit, Penn Plaza*, Bremerton, Washington.

Puget Sound Water Quality Action Team, 1997, *Recommended Guidelines for Measuring Organic Compounds in Puget Sound Water, Sediment, and Tissue Samples*.

TechLaw, Inc., 2006a, *Targeted Brownfields Assessment Report, Old Bremerton Gas Works, McConkey Properties*, Bremerton, Washington.

TechLaw, Inc., 2006b, *Targeted Brownfields Assessment Report, Old Bremerton Gas Works, Sesko Property*, Bremerton, Washington.

U.S. EPA, 1998. Quality Assurance Guidance For Conducting Brownfields Site Assessments.

Washington Department of Ecology, 2001. Model Toxics Control Act, Cleanup Regulation, Chapter 173-340 Washington Administrative Code.

Washington Division of Water Resources Water-Supply Bulletin 18, 1965. *Water Resources and Geology of the Kitsap Peninsula and Certain Adjacent Islands.*

GeoEngineers

Appendix A
Sampling and Analysis Plan

APPENDIX A
SAMPLING AND ANALYSIS PLAN

INTRODUCTION

This Sampling and Analysis Plan (SAP) specifies the field procedures, field quality assurance/quality control (QA/QC) protocol, and the chemical testing program to be implemented during the remedial investigation activities at the McConkey/Sesko (Bremerton Gas Works) Site in Bremerton, Washington. The field activities will include the following elements:

- Collection of soil samples from soil explorations;
- Field screening of soil;
- Collection of groundwater samples from completed monitoring wells;
- Decontamination procedures;
- Handling of investigation-derived waste; and
- Location control

COLLECTION OF SOIL SAMPLES FROM EXPLORATIONS

Soil Sampling

Soil explorations will be advanced using a truck-mounted drilling rig equipped with hollow-stem augers (HSAs) operated by the selected subcontractor. Soil samples will be obtained continuously from each boring location using Shelby tubes, core barrels, or split spoon samplers to document lithology, color and relative moisture content. New, disposable nitrile gloves will be worn by the field staff for each sample collected. Sampling equipment will be decontaminated between each sampling attempt using the methods described in this SAP.

Upon recovery of the samples, portions of the soil will be collected using disposable acrylic plungers. The soil will be extruded from the plungers directly to preserved and unpreserved laboratory-prepared sample containers for chemical analysis. The remaining portion of each sample will be used for field screening tests and logged and classified in general accordance with American Society for Testing and Materials (ASTM) D 2488-90. Field screening methods are discussed later in this SAP.

Selected soil samples from each boring will be analyzed by an accredited laboratory for the following:

- Gasoline- and diesel-range hydrocarbons using methods NWTPH-Gx and NWTPH-Dx (with silica gel cleanup);
- Volatile organic compounds (VOCs) by EPA Method 5035/8260B;
- Semivolatile organic compounds (SVOCs) by EPA Method 8270 SIM;
- Polychlorinated biphenyls (PCBs) by EPA Method 8082; and
- Priority pollutant metals and chromium VI by EPA 6000/7000 series methods and tributyltin (TBT) by Krone (GC/MS).

The collection of field duplicates, rinseate blanks and trip blanks is discussed in detail in Appendix B. Generally, one duplicate sample will be collected per 20 samples submitted for analysis, per sample matrix. Rinseate blanks will be collected at the beginning of each day, prior to sampling activities. One trip blank will be submitted with each sample lot transported to the analytical laboratory. Laboratory QA/QC procedures and requirements are also discussed in Appendix B.

Soil samples will be placed in an ice chest containing ice for storage prior to delivery to the laboratory. Standard chain-of-custody procedures will be observed during transport of the samples to the laboratory.

The following table presents the proposed analytical methods and the sample container requirements, preservation requirements, and holding times for each proposed analysis.

Laboratory Analytical Methods

Analysis	Method No.	Amount Required	Container	Preservation	Holding Time
Gasoline-Range Total Petroleum Hydrocarbons	NWTPH-Gx	S - 2 Vials W - 3 Vials	S,W – Pre-Weighed 44 ml VOA w/ Teflon Septum	S – 5 ml methanol W - Conc. HCL to pH <2 cool 4°C	14 days
Diesel-Range Total Petroleum Hydrocarbons	NWTPH-Dx	S – 50 Grams W – 500ml	S – 4-oz Jar w/ Teflon Septum W – ½-Liter Glass	S – Cool 4°C W – Cool 4°C	14 days
Volatile Organic Compounds	8260B	S - 3 Vials (plus additional quantity with no methanol) W - 3 Vials	S,W – Pre-Weighed 44 ml VOA w/ Teflon Septum	S – 5 ml methanol W - Conc. HCL to pH <2 cool 4°C	14 days
Semivolatile Organic Compounds	8270 SIM	S - 50 Grams W – 1 Liter	S – 4-oz Jar w/ Teflon Septum W - 1 Liter Amber Glass	S – Cool 4°C W – Cool 4°C	S – 14 days W – 7 days to extract, then 40 days
Polychlorinated Biphenyls	8082	S - 50 Grams W – 1 Liter	S – 4-oz Jar w/ Teflon Septum W - 1 Liter Amber Glass	S – Cool 4°C W – Cool 4°C	S – 14 days W – 7 days to extract, then 40 days
Priority Pollutant Metals	EPA 6000/7000 Series	S - 50 Grams W – 1/2 Liter	S – 4-oz Jar w/ Teflon Septum W – 500 mL Poly	S – Cool 4°C W – Nitric Acid; Cool 4°C	S,W – 180 days (except Hg – 28 days
Chromium VI	EPA 7196a (with soil digestion by 3060a)	S - 50 Grams W – 1/2 Liter	S – 4-oz Jar w/ Teflon Septum W – 500 mL Poly	S – Cool 4°C W – Cool 4°C	S,W – 24 hours
Tributyltin	Krone (GC/MS)	S - 50 Grams W – 1 Liter	S – 4-oz Jar w/ Teflon Septum W – (2) 500 mL Poly	S – Cool 4°C W – Cool 4°C	S,W – 7 days

Notes:
S - Soil/Solid
W – Water

DECONTAMINATION PROCEDURES

The objective of the decontamination procedure is to minimize the potential for cross-contamination between sample locations.

A designated decontamination area will be established for decontamination of reusable sampling equipment. Sampling equipment will be decontaminated in accordance with the following procedures before each sampling attempt or measurement.

1. Brush equipment with a nylon brush to remove large particulate matter.
2. Rinse with potable tap water.
3. Wash with nonphosphate detergent solution (Liquinox and potable tap water).
4. Rinse with potable tap water.
5. Rinse with distilled water.

FIELD SCREENING OF SOIL

A GeoEngineers staff scientist will perform field screening tests on selected soil samples obtained from the soil borings. Field screening results will be used to aid in the selection of soil samples for chemical analysis. Screening methods will include: 1) visual examination, 2) water sheen screening, and 3) headspace vapor screening using a PID.

Visual screening consists of inspecting the soil for discoloration indicative of the presence of petroleum in the sample. Water sheen screening involves placing soil in water and observing the water surface for signs of sheen. Sheen classifications are as follows:

- No Sheen (NS) — No visible sheen on the water surface;
- Slight Sheen (SS) — Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly. Natural organic matter in the soil may produce a slight sheen;
- Moderate Sheen (MS) — Light to heavy sheen; may have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on water surface; and
- Heavy Sheen (HS) — Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen.

Headspace vapor screening involves placing a soil sample in a plastic bag. Air is captured in the bag, and the bag is shaken to expose the soil to the air trapped in the bag. The probe of a PID is inserted into the bag, and the PID measures volatile organic compound (VOC) vapor concentrations in parts per million (ppm). The PID is calibrated to isobutylene. The PID is designed to quantify VOC vapor concentrations in the range between 1 ppm and 2,000 ppm with an accuracy of 10 percent of the reading. The lower threshold of significance for the PID in this application is 10 ppm.

Field screening results are site- and sample-specific. The results may vary with temperature, soil moisture content, soil type, and type of contaminant.

COLLECTION OF GROUNDWATER SAMPLES FROM COMPLETED MONITORING WELLS

The monitoring wells will be developed by surging and removing groundwater until fluids appear relatively free of fine-grained sediment. Following development of the monitoring wells and prior to groundwater sample collection, each monitoring well will be purged (with low-flow sampling equipment) of a minimum of three well casing volumes of groundwater, until the monitoring well formation fails to recharge, (i.e., well runs dry) or consistent values (i.e., less than 10% variance between consecutive readings) are obtained for pH, temperature and conductivity. Subsequent to sufficient recharge, one groundwater sample will be collected from each monitoring well utilizing low flow sampling equipment.

Upon recovery of sufficient groundwater quantity, water inside the tubing is immediately transferred to laboratory-prepared containers containing preservative and kept cool during transport to the analytical laboratory. Chain-of-custody procedures will be followed during water sample transport. Sampling equipment will be decontaminated between each sampling attempt using the methods described in this SAP. Used polyethylene tubing will be discarded after each groundwater sampling attempt.

Collected groundwater samples will be submitted for one or more of the following analyses:

- Gasoline- and diesel-range hydrocarbons using methods NWTPH-Gx and NWTPH-Dx (with silica gel cleanup);
- Volatile organic compounds (VOCs) by EPA Method 5035/8260B;
- Semivolatile organic compounds (SVOCs) by EPA Method 8270 SIM;
- Polychlorinated biphenyls (PCBs) by EPA Method 8082; and
- Priority pollutant metals and chromium VI by EPA 6000/7000 series methods and tributyltin (TBT) by Krone (GC/MS).

Field duplicates, rinseate blanks and trip blanks will be collected as discussed previously in this SAP and in Appendix B.

DECONTAMINATION PROCEDURES

The objective of the decontamination procedure is to minimize the potential for cross-contamination between sample locations.

A designated decontamination area will be established for decontamination of direct-push drilling equipment and reusable sampling equipment. Drilling equipment will be cleaned using steam-cleaning equipment. Sampling equipment will be decontaminated in accordance with the following procedures before each sampling attempt or measurement.

1. Brush equipment with a nylon brush to remove large particulate matter.
2. Rinse with potable tap water.
3. Wash with nonphosphate detergent solution (Liquinox and potable tap water).
4. Rinse with potable tap water.
5. Rinse with distilled water.

HANDLING OF INVESTIGATION-DERIVED WASTE

Investigation-derived waste (IDW), mainly drill cuttings and decontamination/purge water, will be placed in U.S. Department of Transportation (DOT)-approved 55-gallon drums. Each drum will be labeled with the project name, exploration number, general contents, and date. The drummed IDW will be stored onsite pending analysis and disposal.

Disposable items, such as sample tubing, direct-push sampler acrylic sleeves, disposable bailers, bailer line, gloves and protective overalls, paper towels, etc., will be placed in plastic bags after use and deposited in trash receptacles for disposal.

GeoEngineers

Appendix B
Quality Assurance Project Plan

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) presents the quality assurance (QA) and quality control (QC) activities developed for the remediation activities at the McConkey/Sesko (Bremerton Gas Works) Site in Bremerton, Washington. This QAPP is intended to satisfy the Environmental Protection Agency's (EPA) requirement for a site-specific QAPP under the Brownfields Revitalization Act of 2002.

This QAPP has been reviewed and approved by the persons listed on the Work Plan signature page.

PROJECT MANAGEMENT

The Bremerton Gas Works Site has multiple participating team members, which are divided into two categories: a) stakeholders; and b) the project implementation team. In general, the State of Washington and Federal agencies involved in the project, along with the City of Bremerton ("the City") comprise the stakeholders. The Community as referenced herein, is comprised of the neighboring homes and businesses bordering the project site. The Community is also considered an important stakeholder of the project. GeoEngineers and the project remediation contractor comprise the implementation team.

PROJECT ORGANIZATION AND RESPONSIBILITY

The organizational structure of the project team is described below. GeoEngineers, Inc. (GEI) will implement the project on behalf of the City. The roles of key GeoEngineers' project personnel are described below.

The City of Bremerton

The City is the recipient of grant funds provided through the EPA Brownfield Program. The City is also the lead for the property owner stakeholder group and the City is the grant fund manager. The City will forward required project documents to EPA Region 10 for review and/or approval.

As fund manager, The City will execute the grant, approve invoices, perform grant administration ensuring that assessment and remediation costs are allowable, and reimbursement payments are made expeditiously and consistent with the grant agreement.

Mr. Dan Miller will serve as the Project Manager for the City for this project.

U.S. Environmental Protection Agency

The EPA will initiate consultation and make the final determination under the requirements of Federal Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA). EPA also has review and approval responsibility for this QAPP. EPA also will provide oversight for follow up assessment activities through a Targeted Brownfield Assessment. GeoEngineers will work with EPA to merge the results of the preliminary assessment (the focus of this work plan) and the later TBA.

Washington State Department of Ecology

Ecology will be the lead regulatory agency and will review and comment on documents and will provide technical support through the Voluntary Cleanup Program. At this time, we understand that the City is interested in entering the VCP after the results of this preliminary study are known.

Project Implementation Team

On behalf of the City, GeoEngineers will implement the proposed preliminary remedial investigation. GeoEngineers will also utilize several subcontractors for the work. Roles of key implementation team personnel are described below.

Principal in Charge and Quality Assurance Officer: Dave Cook, L.G., R.B.P.
The Quality Assurance Officer (QAO) QA responsibilities will include monitoring project quality assurance procedures to ensure compliance with this QAPP. The QAO will be responsible for providing final review of all project deliverables and will serve as a technical resource throughout the project. The Principal will have final signatory authority related to contractual issues and technical report preparation.

Project Manager: Sean Trimble, L.G.
The GeoEngineers Project Manager (PM) will maintain primary responsibility for the operations and management of the project. The PM will manage the project, communicate with team members, coordinate daily operations, and maintain control over the schedule, budget, and technical aspects of the project. The PM will have responsibility for project deliverables and manage subcontractor's activities.

Health and Safety Officer: Leah Alcyon
The Health and Safety Officer (HSO) will be responsible for ensuring: 1) project personnel maintain appropriate levels of training, as specified by Occupational Health and Safety Administration (OSHA) and Washington Department of Labor and Industries (L&I) protocols; 2) health and safety plans (HASPs) are prepared and maintained in accordance with OSHA and L&I protocols; and 3) field operations are conducted using health and safety protocols that are appropriate and protective. The HSO will ensure that subcontractors have HASPs relative to their respective contracts.

Field Oversight Manager: Sean Trimble, L.G.
The field manager will be responsible for implementing the Work Plan, including preparation for the field events, implementation of all field activities, and maintaining chain-of-custody with the analytical laboratory. GeoEngineers staff geologists, engineers, or environmental scientists will assist with implementation of the field activities.

SPECIAL TRAINING NEEDS/CERTIFICATION

Each GEI employee working in the field will have 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training, and will be up to date on annual 8-hour refresher courses. All field staff will also be trained in applicable OSHA and L&I guidelines pertaining to site work. Health and safety protocol will be followed during all field activities, as outlined in the attached HASP (Appendix C).

SUBCONTRACTORS

Subcontractors (drilling contractor, utility locator, and laboratory) will be utilized by the implementation team to complete underground utility locating, remedial investigation, and laboratory testing to support the proposed scope of work.

QUALITY OBJECTIVES AND CRITERIA

The general quality objective of this QAPP is to provide environmental data in various media (soil and groundwater) that are of known and dependable quality. This is intended to ensure that interpretations, recommendations, and evaluation of human health risk based on physical data are based on sound data collection and analytical methods.

Specific project tasks that do not generate data are described in this section using a qualitative measure of success unique to each task. The measurements of success for each task are described in the following sections.

PROJECT QUALITY OBJECTIVES

Task-related data quality objectives (DQOs) will vary according to the nature of the task. Data quality parameters for tasks requiring measurements will be evaluated on precision, accuracy, representativeness, completeness, comparability, and range. Data quality for field sampling methods will be based on measurement quality criteria listed above, and may be checked using analytical results of field duplicate samples. For analytical analyses, established precision and accuracy protocols, combined with those outlined in this QAPP, should suffice for analytical data quality. The laboratory's QA manager is responsible for maintaining the method-defined and QAPP-defined QA/QC criteria.

MEASUREMENT AND DATA ACQUISITION

Sampling Process Design

The basis and scope of the field delineation activities are described in Section 4 of the Work Plan. The schedule for project implementation is presented in the Section 5 of the Work Plan.

Sampling and Analytical Methods and Data Quality Objectives

Field sampling methods are described in detail in Appendix A. Analytical methods that are proposed for this project include:

- Gasoline- and diesel-range hydrocarbons using methods NWTPH-Gx and NWTPH-Dx (with silica gel cleanup);
- Volatile organic compounds (VOCs) by EPA Method 5035/8260B;
- Semivolatile organic compounds (SVOCs) by EPA Method 8270 SIM;
- Polychlorinated biphenyls (PCBs) by EPA Method 8082; and
- Priority pollutant metals and chromium VI by EPA 6000/7000 series methods and tributyltin (TBT) by Krone (GC/MS).

Data quality objectives (DQOs) utilized during this project will be consistent with MTCA cleanup levels. The City intends to develop the site for commercial purposes. Preliminary plans indicate the site will be developed with commercial structures and associated parking and landscaped areas. Therefore, project DQOs were developed based on human health criteria only. Analytical data generated during the site investigation are intended to be sufficient for risk assessment purposes and capable of calculating risk below the 1 x 10^{-6} risk level. MTCA Method A soil and groundwater cleanup levels for unrestricted land use, when established, will be utilized to set the analytical limit goals for contaminants of potential concern (COPC). The most conservative MTCA Method B cleanup standards will be used as the analytical limit goals for COPC that lack established MTCA Method A cleanup standards.

Method reporting limit goals (MRLGs) are provided in the following tables. If unanticipated contaminants are encountered, we will confirm the MRLGs prior to analysis. We will require that the laboratory utilize analytical method reporting limits for each proposed analysis that are equal to or less than the MRLGs, when possible.

Method Reporting Limit Goals

Analysis (Method) Analyte	Quantitation Limits Soil[a,b] (units)	Quantitation Limits Water[a,b] (units)
Total Petroleum Hydrocarbons	**(mg/kg)**	**(µg/L)**
NWTPH-Gx	5	250
NWTPH-Dx	25	100
NWTPH-Ox	25	100
Volatile Organic Compounds (Method GC/MS-8260B)	**(µg/kg)**	**(µg/L)**
Dichlorodifluoromethane	5.0	0.50
Chloromethane	5.0	0.50
Vinyl Chloride	5.0	0.50
Bromomethane	5.0	0.50
Chloroethane	5.0	0.50
Trichlorofluoromethane	5.0	0.50
Acetone	20	20
1,1-Dichloroethene	5.0	0.50
Methyl tert-Butyl Ether (MTBE)	5.0	0.50
Carbon Disulfide	5.0	0.50
Methylene Chloride	10.0	2.0
trans-1,2-Dichloroethylene	5.0	0.50
1,1-Dichloroethane	5.0	0.50
2-Butanone (MEK)	20	20
2,2-Dichloropropane	5.0	0.50
cis-1,2-Dichloroethylene	5.0	0.50
Chloroform	5.0	0.50
Bromochloromethane	5.0	0.50
1,1,1-Trichloroethane (TCA)	5.0	0.50
1,1-Dichloropropene	5.0	0.50
Carbon Tetrachloride	5.0	0.50
1,2-Dichloroethane (EDC)	5.0	0.50
Benzene	5.0	0.50
Trichloroethylene (TCE)	5.0	0.50
1,2-Dichloropropane	5.0	0.50

Method Reporting Limit Goals (continued)

Analysis (Method) Analyte	Quantitation Limits Soil[a,b] (units)	Quantitation Limits Water[a,b] (units)
Bromodichloromethane	5.0	0.50
Dibromomethane	5.0	0.50
2-Hexanone	20	20
cis-1,3-Dichloropropene	5.0	0.50
Toluene	5.0	0.50
trans-1,3- Dichloropropene	5.0	0.50
1,1,2-Trichloroethane	5.0	0.50
4-Methyl-2-pentanone (MIBK)	20	20
1,3-Dichloropropane	5.0	0.50
Tetrachloroethylene (PCE)	5.0	0.50
Dibromochloromethane	5.0	0.50
1,2-Dibromomethane (EDB)	20	2.0
1,1,1,2-Tetrachloroethane	5.0	0.50
Ethylbenzene	5.0	0.50
m-,p-Xylenes	5.0	0.50
o-Xylene	5.0	0.50
Styrene	5.0	0.50
Bromoform	5.0	0.50
Isopropylbenzene	20	2.0
1,1,2,2-Tetrachloroethane	5.0	0.50
1,2,3-Trichloropropane	5.0	0.50
Bromobenzene	5.0	2.0
n-Propylbenzene	20	2.0
2-Chlorotoluene	20	2.0
4-Chlorotoluene	20	2.0
1,3,5-Trimethylbenzene	20	2.0
tert-Butylbenzene	20	2.0
1,2,4-Trimethylbenzene	20	2.0
sec-Butylbenzene	20	2.0
1,3-Dichlorobenzene	5.0	0.50
4-Isopropyltoluene	20	2.0
1,4-Dichlorobenzene	5.0	0.50
n-Butylbenzene	20	2.0
1,2-Dichlorobenzene	5.0	0.50
1,2-Dibromo-3-chloropropane	20	2.0

Method Reporting Limit Goals (continued)

Analysis (Method) Analyte	Quantitation Limits Soil[a,b] (units)	Quantitation Limits Water[a,b] (units)
1,2,4-Trichlorobenzene	20	2.0
1,2,3-Trichlorobenzene	20	2.0
Naphthalene	20	2.0
Hexachlorobutadiene	20	2.0
Chlorinated Benzenes (Method 8270C)	**(µg/kg)**	**(µg/L)**
1,2-Dichlorobenzene	NA	NA
1,3-Dichlorobenzene	NA	NA
1,4-Dichlorobenzene	NA	NA
1,2,4-Trichlorobenzene	NA	NA
Hexachlorobenzene	NA	NA
Phthalate Esters (Method 8270C)	**(µg/kg)**	**(µg/L)**
Dimethyl Phthalate	NA	NA
Diethyl Phthalate	NA	NA
Di-n-butyl Phthalate	NA	NA
Butylbenzyl Phthalate	NA	NA
Bis[2-ethylhexyl] Phthalate	NA	NA
Di-n-octyl-Phthalate	NA	NA
Semivolatile Organic Compounds (Method 8270C)	**(µg/kg)**	**(µg/L)**
Dibenzofuran	NA	NA
Hexachlorobutadiene	NA	NA
Hexachloroethane	NA	NA
N-nitrosodiphenylamine	NA	NA
Ionizable Organic Compounds (Method 8270C)	**(mg/kg)**	**(µg/L)**
Phenol	NA	NA
2-Methylphenol	NA	NA
4-Methylphenol	NA	NA
2,4-Dimethylphenol	NA	NA
Pentachlorophenol	NA	NA
Benzyl Alcohol	NA	NA
Benzoic Acid	NA	NA
Polycyclic Aromatic Hydrocarbons (Method 8270C SIM)	**(µg/kg)**	**(µg/L)**
Acenaphthene	5	0.02
Acenaphthylene	5	0.02
Anthracene	5	0.02

Method Reporting Limit Goals (continued)

Analysis (Method) Analyte	Quantitation Limits Soil[a,b] (units)	Quantitation Limits Water[a,b] (units)
Benz(a)anthracene	5	0.02
Benzo(a)pyrene	5	0.02
Benzo(b)fluoranthene	5	0.02
Benzo(k)fluoranthene	5	0.02
Benzo(g,h,i)perylene	5	0.02
Chrysene	5	0.02
Dibenzo(a,h)anthracene	5	0.02
Fluoranthene	5	0.02
Fluorene	5	0.02
Indeno(1,2,3-cd)pyrene	5	0.02
Naphthalene	5	0.02
Phenanthrene	5	0.02
Pyrene	5	0.02
Polychlorinated Biphenyls (PCBs) (Method GC-8082)	**(mg/kg)**	**(µg/L)**
PCB Mixtures	0.01	0.04
Metals (6000/7000 Series Methods)	**(mg/kg)**	**(µg/L)**
Antimony	1	1
Arsenic	1	0.5
Beryllium	1	1
Cadmium	1	0.02
Chromium (Total)	2	5
Chromium VI (Method 7196a)	0.5	NA
Copper	1	1
Lead	1	0.02
Mercury	0.02	0.2
Nickel	1	1
Selenium	1	10
Silver	1	0.02
Thallium	0.1	1
Tributyltin (Krone)[c]		
Zinc	1	1

Notes:

a. Quantitation limits derived from *Test Methods for Evaluating Solid Waste*, SW-846 (USEPA 1986).

Notes (continued):

b. Specific quantitation limits are matrix-dependent. Quantitation limits listed are provided for guidance only and may not be achievable.

c. Tributyltin analyses will be performed in accordance with the guidelines set for in *Recommended Guidelines for Measuring Organic Compounds in Puget Sound Water, Sediment, and Tissue Samples* (1997, Puget Sound Water Quality Action Team).

Preventative Maintenance – Field Equipment

GeoEngineers performs routine inspections and preventative maintenances (parts replacement and cleaning) for all pieces of field equipment in our office warehouse. These activities are conducted before and after each fieldwork event. Maintenance activities are conducted by our field technicians who are specifically trained in the use, operation, and maintenance of the equipment.

All field equipment used during this project, including water level indicators, photoionization detectors, and pH or conductivity and temperature meter will be cleaned and decontaminated prior to use.

Each piece of equipment will be inspected and tested to ensure proper working function and facilitate replacement or repair of broken or non-operational components. Key spare parts will be included in the equipment cases to facilitate troubleshooting and repair under field conditions.

Calibration and Corrective Action – Field Equipment

The PID will be calibrated at the start of each sampling day. The calibration standards will be within the range of the anticipated measurement. The instrument will also be recalibrated at any time an anomalous reading suggests instrument imprecision or inaccuracy. All calibration procedures will be performed according to the manufacturer's specifications.

Preventative Maintenance – Laboratory Equipment

Contract laboratories perform routine testing, inspection, and preventative maintenance (parts replacement and cleaning) of all instruments and equipment, and provide a clean, climate-controlled environment instrument/equipment operation.

Major instruments such as gas chromatographs, atomic absorption spectrophotometers, analytical balances and GC/MS systems are maintained under commercial services contracts or by qualified in-house service technicians. All instrument maintenance is recorded in the associated instrument logbook for future reference and validation of scheduled maintenance. Logbook entries include the date, analysts name, detailed description of the problem, detailed explanation of the solution and a verification that the instrument is functioning properly.

Calibration and Corrective Action – Laboratory Equipment

The analytical laboratory will maintain standard procedures for calibration and a system of corrective action to ensure continuous acceptable quality levels for laboratory services. In order to meet this goal, the laboratory will be provided the standard calibrations procedures communicated in the QAPP and will be required to state their ability to comply with the procedures. For corrective action, the QAPP contains the systems established to assure that conditions adverse to quality are promptly identified and corrected. This corrective action system functions at both the bench level through recognition and response to isolated events and at the management level through trend analysis.

Calibration of Laboratory Instruments/Equipment

In general, laboratory calibration procedures are divided into fixed or within-batch calibration. Fixed calibration utilizes a calibration curve over a number of analytical batches. In within-batch calibration, a calibration curve or factor is determined for each batch of analyzed samples.

Each instrument is normally calibrated for the specific analytical method for which it is allocated. Once the operating parameters have been established according to that method, the analyst prepares standard solutions containing all of the analytes of interest, any internal standards and any surrogate standards appropriate to the method. To establish the calibration curve for the particular analyte, these standard solutions are prepared at graduated dilution. One of the concentrations must be above the detection limit while the others are used to define the working range of the instrument.

Standards for instrument calibration are obtained from a variety of sources. Elemental standards are purchased from commercial suppliers, dated upon receipt and replaced as needed according to the methodology. A standard log is kept containing the analyte name, date of receipt, supplier lot number, concentration, any analyte dilutions and a unique code number.

Analysts document the use of standards by entering the code number in their notebooks. Specific guidelines for standards handling, preparation, and traceability for the selected analytical laboratory will be reviewed for conformance with this QAPP.

Laboratory Instrument Calibration Frequencies

Instrument calibration is performed on an as-needed basis in accordance with the specific method requirements. Recalibrations are performed when fundamental changes to the instrument characteristics occur (i.e., change of analytical column, etc.) or when results of QC check standards or samples indicate an out-of-control condition

Laboratory Calibration of Miscellaneous Equipment

Calibration and service of balances is performed on an annual basis by an outside company. Calibration is checked using standardized in-house weights for each day of use. Calibration of thermometers is performed by checking against a National Institute of Standards and Technology (NIST) traceable reference thermometer on an annual basis.

Laboratory Calibration Equations

The following are equations used to calculate calibration and response factors:

Calibration factors (CF) are calculated for those methods that use external standards and the response factor (RF) for those methods that use internal standards. The corresponding equations are specified below:

CF = Total Area of Peak/Mass Injected in Nanograms
RF = (Area of Analyte)(Concentration of Internal Standard)/(Area of Internal Standard)
(Analyte Concentration)

The CFs and RFs for each of five analyte and surrogate concentrations are tabulated. In general, the five CFs or RFs for each analyte or surrogate should have a Percent Standard Deviation (% PSD) of less than 20 percent. The following equation is utilized for calculating the % PSD:

$$\% \text{ PSD} = (\text{SD}/x)(100)$$

Where, the SD or standard deviation of the initial 5 CFs or RFs for each compound is calculated with the following equation:

$$SD = \sqrt{\sum_{i=1}^{n} \frac{(x_i - \bar{x})^2}{n-1}}$$

Where $\bar{x}$ = mean of initial five CFs or RFs for each compound

If the % PSD is less than 20 percent, then the calibration curve is considered linear through the origin, and a mean CF or RF is used. The CFs and RFs for each compound are graphed and all calculations are kept in the analyst's notebook.

The validity of the calibration curve is checked daily for most instruments and more frequently for instruments with particularly sensitive detectors that tend to drift. The analyst prepares a daily calibration check standard solution in a similar manner as that prepared for the initial calibration check standard solution.

The daily calibration check standard solution CF or RF must be within 20 percent of the average CF or RF of the calibration curve. The following is the equation for calculating the percent difference of the average CF or RF calibration curve:

% Difference = [(Average CF or RF) – (Calibration Check CF or RF)/Average CF or RF] (100)

Some organic analytical methods have prescribed limits that may differ from these calculations. In those cases, individual method specifications override these general procedures. In addition, some GC/MS tuning methods have prescribed calibration procedures that are not described here. In those cases, the individual method guidelines should be followed.

Laboratory Corrective Actions – Bench Level

Isolated events which may have a negative impact on quality are documented at the bench level through use of a nonconformance report (NCR). Any individual event that may affect quality is recorded on the NCR and brought to the immediate attention of the department manager. Examples of such events include quality control sample results out of control limits, one time variation in the method parameters due to an unusual matrix, and evidence of lab contamination and loss or damage to the sample or its extract. When such an event is recognized, its impact on quality is assessed and a corrective action is decided upon. The action is approved by the area supervisor and/or quality assurance officer. A copy of the nonconformance report is filed with the data report for subsequent review by the project manager. A second copy of the NCR is given to the quality assurance officer to be filed in chronological order.

Predetermined limits for data acceptability are given in the laboratory's specific QC policy's standard operating practices (SOPs) for each analytical area. Specific guidelines on how analysts are to respond to outliers are documented in the corrective action SOPs for each analytical area.

SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Sample Containers

Sample containers will be obtained directly from the analytical laboratory performing the analysis. Container type, number, volume, preservatives and maximum sample holding times to extraction and/or analysis will be completed as specified by the respective EPA and Northwest analytical methods.

Sample Handling and Custody

Sample handling and custody will be completed by the GeoEngineers field manager and laboratory sample control personnel. Sample handling in the field will typically consist of placement of labeled, filled sample containers into individual Ziploc® bags and into insulated coolers with ice. Styrofoam peanuts or bubble wrap will be placed around the sample containers within the cooler, if necessary, to ensure safe storage and container integrity during transport.

The following table presents the proposed analytical methods and the sample container requirements, preservation requirements, and holding times for each proposed analysis.

Laboratory Analytical Methods

Analysis	Method No.	Amount Required	Container	Preservation	Holding Time
Gasoline-Range Total Petroleum Hydrocarbons	NWTPH-Gx	S - 2 Vials W - 3 Vials	S,W – Pre-Weighed 44 ml VOA w/ Teflon Septum	S – 5 ml methanol W - Conc. HCL to pH <2 cool 4°C	14 days
Diesel-Range Total Petroleum Hydrocarbons	NWTPH-Dx	S – 50 Grams W – 500ml	S – 4-oz Jar w/ Teflon Septum W – ½-Liter Glass	S – Cool 4°C W – Cool 4°C	14 days
Volatile Organic Compounds	8260B	S - 3 Vials (plus additional quantity with no methanol) W - 3 Vials	S,W – Pre-Weighed 44 ml VOA w/ Teflon Septum	S – 5 ml methanol W - Conc. HCL to pH <2 cool 4°C	14 days
Semivolatile Organic Compounds	8270 SIM	S - 50 Grams W – 1 Liter	S – 4-oz Jar w/ Teflon Septum W - 1 Liter Amber Glass	S – Cool 4°C W – Cool 4°C	S – 14 days W – 7 days to extract, then 40 days
Polychlorinated Biphenyls	8082 Modified	S - 50 Grams W – 1 Liter	S – 4-oz Jar w/ Teflon Septum W - 1 Liter Amber Glass	S – Cool 4°C W – Cool 4°C	S – 14 days W – 7 days to extract, then 40 days
Priority Pollutant Metals	EPA 6000/7000 Series	S - 50 Grams W – 1/2 Liter	S – 4-oz Jar w/ Teflon Septum W – 500 mL Poly	S – Cool 4°C W – Nitric Acid; Cool 4°C	S,W – 180 days (except Hg – 28 days
Chromium VI	EPA 7196a (with soil digestion by 3060a)	S - 50 Grams W – 1/2 Liter	S – 4-oz Jar w/ Teflon Septum W – 500 mL Poly	S – Cool 4°C W – Cool 4°C	S,W – 24 hours
Tributyltin	Krone (GC/MS)	S - 50 Grams W – 1 Liter	S – 4-oz Jar w/ Teflon Septum W – (2) 500 mL Poly	S – Cool 4°C W – Cool 4°C	S,W – 7 days

Notes:
S - Soil/Solid
W – Water

Sample Identification

Each container will be labeled by the field technician to avoid the possibility of misidentification. Each sample label will contain the field sample identification, sample description, sample date, sample time and sampler name. Upon receipt at the analytical laboratory, each sample will be logged into a bound notebook with numbered pages. Each sample will be assigned a unique laboratory identification number used by the laboratory for analysis assignment, sample tracking and data reporting.

Chain of Custody

Field sample management will follow specific procedures to ensure sample integrity. Sample possession will be tracked from collection to analysis. Each time the samples are transferred between parties, both the sender and receiver will sign and date the chain-of-custody form and specify which samples have been transferred. When a sample shipment is sent to the laboratory, the cooler will be sealed with custody tape and the original form will be placed with the samples and transported to the laboratory. A copy of the form will be retained in the project files. A chain-of-custody record will be completed for each batch of samples hand-delivered or shipped to the laboratory. The laboratory will assume sample custody upon receipt and retain the samples in a secure area. In addition to the labels, seals and chain-of-custody form, other components of sample tracking will include the field log book, sample shipment receipt and laboratory log book.

ANALYTICAL PRECISION AND ACCURACY

The overall project quality assurance objective will be to develop and implement procedures to provide data that are accurate, reliable, reproducible, and representative of the site. Data quality will be assessed by representativeness, comparability, accuracy, precision and completeness. Definitions of these terms, as they apply to quality control, are described below.

Representativeness

Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of chemical compounds in the media sampled. Sampling plan design, sampling techniques and sample handling protocols will be developed to ensure that samples collected are representative of site conditions within the limitations of the collection technologies. The proposed documentation will establish protocols for assurance of sample identification and integrity. Field duplicate samples will be used to assess matrix homogeneity, and laboratory accuracy and precision.

Comparability

Data comparability will be ensured by monitored control of sample collection, analytical methods and data recording. Comparability of laboratory and field data will be maintained by using Environmental Protection Agency (EPA)-defined procedures where available. Data comparability will be maintained by use of consistent methods and units. Actual detection limits will depend on the sample matrix and will be reported as defined for the specific samples.

Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported value versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

Accuracy will be expressed as the percent recovery of a surrogate compound (also know as "system monitoring compound"), a matrix spike result, or from a standard reference material and may be calculated using the equation(s) below.

For measurements where matrix spikes are used:

$$\%R = 100\% \times [S-U/Csa]$$

where

%R = Percent Recovery
S = Measured Concentration in Spiked Aliquot
U = Measured Concentration in Unspiked Aliquot
Csa = Actual Concentration of Spike Added

For situations where a standard reference material (SRM) is used instead of or in addition to matrix spikes:

$$\%R = 100\% \times [Cm/Csm]$$

Where

%R = Percent Recovery
Cm = Measured Concentration of SRM
Csm = Actual Concentration of SRM1

Persons performing the evaluation must review one or more pertinent documents (USEPA February 1994; USEPA 1986; or USEPA 1983) that address criteria exceedences and courses of action.

Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for water samples. This value is calculated by:

$$RPD\,(\%) = \frac{|D_1 - D_2|}{(D_1 + D_2)/2} X\,100,$$

Where

D_1 = Concentration of analyte in sample.

D_2 = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates), and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (USEPA February 1994; USEPA 1986; or USEPA 1983) that address criteria exceedences and courses of action. Relative percent difference goals for this effort is 30 percent in water and 40 percent in soil for all analyses.

Completeness

Completeness is a measure of the amount of valid data obtained from the analytical system. The completeness of the data will be assessed during quality control reviews. The completeness goal will be 90 percent. Audits, internal control checks and preventative maintenance will be implemented to help maintain the above quality assurance objectives.

FIELD AND LABORATORY QUALITY CONTROL REQUIREMENTS

FIELD QUALITY CONTROL REQUIREMENTS

Field quality control measures will include collection of duplicate, rinseate, and trip blank samples as well as documentation of field measurements and observations, and field instrument calibration.

Collection of Quality Control Samples

Field Duplicate Samples

Field duplicate samples will be collected for each matrix at a minimum frequency of one sample per 20 samples, with a minimum of one duplicate within each media per sampling event. Duplicate samples will be collected to assess matrix homogeneity, sampling procedures, and laboratory analytical consistency.

Rinseate Blank Samples

One rinseate blank will be collected for each day of field sampling activities. Rinseate blanks will be collected by pouring distilled water over reusable sampling equipment at the conclusion of a day of sampling activities. Rinseate blank samples are intended to assess the effectiveness of equipment decontamination procedures.

Trip Blank Samples

Sealed trip blank samples, consisting of carbon-free water, will be obtained from the analytical laboratory and accompany each batch of samples from the site to the project laboratory. They will be used to assess the cleanliness of sample containers and container handling during transport and laboratory log-in.

Field Measurements and Observations

All field measurements and observations will be recorded in daily field reports that will be maintained in a project file. The file will be bound, and all field reports and communication documents will be organized chronologically. Key information and observation will be recorded directly and legibly in the field reports. If changes are made, the changes will not obscure the previous entry, and the changes will be signed and dated. At a minimum, the following data will be recorded in the field report:

- Purpose of activity;

- Location of activity;
- Description of sampling reference point(s) and coordinates;
- Date and time of any activity;
- Sample number identification;
- Sample number and volume;
- Sample transporting procedures;
- Field measurements made;
- Calibration records for field instruments;
- Relevant comments regarding field activities; and
- Signatures of responsible personnel.

Sufficient information will be recorded in the field report so that all field activities can be reconstructed without reliance on personnel memory.

LABORATORY QUALITY CONTROL REQUIREMENTS

The project laboratory will be required to adhere to a strict internal quality control program. Method blanks, duplicate samples, matrix spike and spike duplicate, and laboratory control standards are used at frequent intervals for internal quality control. A careful field sampling program, strict chain-of-custody procedures, and collection of adequate sample volumes for duplicate and spike samples will provide the internal quality control needed for this program. Laboratory quality control measures, including information on calibration procedures, are described below.

Method Blanks

Method blanks, consisting of carbon-free water and carried through the chemical analytical program, serve to measure potential contamination associated with laboratory storage, preparation, or instrumentation. For most analyses, method blanks are analyzed on a daily basis and at a frequency of one per 20 samples if more than 20 samples are analyzed in a given batch.

Calibration Blanks

Calibration blanks are prepared with standards to create an instrument calibration curve. They differ from other standards only by the absence of an analyte and provide the zero-point for the curve.

Sample Blanks

Sample blanks are used when characteristics such as color or turbidity interfere with a determination. In a spectrophotometric method, for example, the natural absorbency of the sample is measured and subtracted from the absorbency of the developed sample. Sample blanks are run only as necessary.

Internal Standards

Internal standards are measured amounts of certain compounds added after sample preparation or extraction. They are used in an internal standard calibration method to correct for sample results which are compromised by capillary column injection losses, purging losses, or viscosity effects. Internal standard calibration is currently used for volatile organic compounds VOCs and semivolatiles and by

Gas Chromatograph/Mass Spectrometer (GC/MS) and inductively-coupled plasma (ICP) analytical methods.

Surrogates

Surrogates are measured amounts of certain compounds added before sample preparation or extraction. Analysts measure the surrogate recovery to determine systematic extractions problems. Surrogates are added to all samples analyzed for GC/MS extractables and volatiles and GC volatiles.

Spikes

Spikes are aliquots of samples to which known amounts of an analyte have been added and are extracted and analyzed. The stock solutions used for spiking are purchased or prepared independently of calibrations standards. The spike recovery measures the effects of matrix interferences and reflects the accuracy of the determination. Spike recoveries are calculated as follows:

$$\% \text{ REC} = (S - Rav/T - Rav)(100)$$

Where:

S = observed concentration of analyte in the spiked sample
Rav = average determination of the analyte concentration in the original sample
T = theoretical concentration of analyte in the spiked sample

Spikes are prepared and analyzed on a daily basis and at a frequency of at least one per 20 samples or one per batch, whichever is more frequent.

Duplicates and Duplicate Spikes

Duplicates are additional aliquots of samples subjected to the same preparation and analytical scheme as the original sample suite. In cases where the analyte concentration is consistently below the method detection limit, duplicate spikes are substituted for duplicate samples. The RPD between duplicates or duplicate spikes measures the precision of a given analysis. The RPD is calculated as follows:

$$\% \text{ RPD} = (R1 - R2/Rav)(100)$$
$$= (S1 - S2/Sav)(100)$$

Where:

R1 and R2 = duplicate determinations of the analyte in the sample
S1 and S2 = observed concentrations of the analyte in the spike and its duplicate
Rav = average determination of the analyte concentration in the original sample
Sav = average of observed analyte concentration in spike and spike duplicate

Duplicate and spike duplicates are prepared and analyzed on a daily basis, and at a frequency of at least 1 per 20 samples or 1 per batch, whichever is more frequent.

Laboratory Control Standards

Laboratory control standards (LCS) or quality control check standards (QCCS) are aliquots of carbon-free or deionized water to which known amounts of an analyte have been added. They are subjected to the sample preparation or extraction procedure and are analyzed as samples. Stock solutions used for LCSs are purchased or prepared independently of the calibration standards. The LCS recovery evaluates the functioning analytical method process and equipment function.

LCSs are prepared and analyzed on a daily basis and at a frequency of 1 per 10 samples if more than 10 samples are run on a given day. For every 10 samples logged in for a particular determination, the laboratory computer generates a call for an LCS to be analyzed. The true values and recovered concentrations are archived and retrievable for statistical analysis. Laboratory control limits are calculated when 20 data points become available.

LABORATORY DATA VALIDATION AND USABILITY

Procedures at the laboratory for verifying data accuracy and completeness include at least three levels of review for both data accuracy and completeness before release. Data accuracy review is initiated at the bench level with a peer review system. At this level, all calculations and entries into data logbooks are checked for error by a second analyst. The second level of review is performed by an area supervisor. Upon completion of a batch sample data set and prior to release, the laboratory project manager conducts a third level of data accuracy review.

Review of data completeness is initiated in the sample login area to insure that internal worksheets match the request on the chain-of-custody forms. The laboratory project manager performs a second level of review before datasheets are given to the analytical areas. Once the results are complete, the laboratory project manager performs a third level of review to ensure that all analyses initially requested were performed.

Verification and Validation Methods

Data is verified and validated through several processes before release of the final data package. The process is initiated at the analytical bench through documentation of all testing parameters in the analyst's notebook. All measurements and calculations for the sample as well as quality control measures are documented in the notebook. Once the analyst is satisfied that the analytical batch meets all quality control requirements and has quantified the sample results, they are transferred to a set of laboratory worksheets as stated on the chain-of-custody report.

When completed, the data on the worksheets are entered into an electronic database. The laboratory project manager reviews the results from the database and checks that the analyses performed are appropriate to the client's requests. Related analyses from the same sample are compared for coherence, and the data are compared with previous results (if available) from the same source to observe any deviations from established trends. Any corrections that are necessary are made at this time and a final report is generated. After the final report is generated it is again reviewed by the project manager to ensure accurate transfer of information from the laboratory worksheets to the final report. After the final review, the laboratory project manager signs the final report. The laboratory manager reviews approximately 15 percent of all the approved PM reports.

Hardcopies of final reports, including the original laboratory worksheets and chain-of-custody are kept in a secure filing area for as minimum of 5 years.

Data reporting parameters typically included in the laboratory reports include the following:

- Chain-of-Custody Forms
- Date of Sample Receipt and Condition

- Dates of Sample Analysis, extraction, digestion, or distillation
- Analytical tuning for GC/MS
- Initial calibrations for organics with the date each initial standard was run, the concentration and response factor of the compounds in each initial standard, and the average response factor and standard deviation for each compound in the initial standards.
- Continuing calibrations for organics with the date that each daily or continuing standard was run, the concentration and response factor of the compounds in each daily or continuing standard, and the percent difference between the daily or continuing standard and the average initial calibration standard.
- Initial calibration verification and continuing calibration verifications for inorganics with the true value, detected value and percent recovery for each parameter.
- Mass spectra for compounds found in each sample and the corresponding standard.
- Laboratory blank results including method blanks, calibration blanks, and continuing calibration blanks, and a list of associated samples.
- Percent surrogate recoveries for samples blanks, duplicates, and matrix spikes with the names and concentrations of each surrogate compound.
- Laboratory duplicate analysis with the relative percent difference between the duplicates.
- Matrix spike/matrix spike duplicate analysis with the name and concentrations of each spiking compound, the percent recovery and the relative percent difference of the matrix spike and matrix spike duplicate recoveries.
- Laboratory control sample analysis with percent recoveries and control limits for each parameter.
- Inductively-coupled plasma (ICP) interference check sample with percent recoveries of parameters.
- ICP linear range for each parameter determined by ICP.
- Reporting and quantitation limits for all parameters.

Raw data to support calculation of the above summaries are kept at the project laboratory.

DATA MANAGEMENT AND DOCUMENTATION

All data logs and data report packages will be located in both the project file and in the electronic database system in GeoEngineers' offices. Data reports will be available in both hard copy and electronic formats. Laboratory data reports will include all internal laboratory quality control checks and sample results. Data logs and packages that are anticipated to be generated during the investigation include laboratory data report packages, groundwater field sampling data sheets, sample chain-of-custody forms, instrument calibration logs and air monitoring logs.

All data will be supplied to GeoEngineers in both Electronic Data Deliverable (EDD) format and hard copy format. The hard copy will serve as the official record of laboratory results. The EDD will be compatible with MS Excel, and will include the following minimum data requirements in unique cells within the EDD:

- The reported concentration;

- The method reporting limit;
- Any flags assigned by the laboratory;
- The sampling date and time; and
- The Chemical Abstracts Service (CAS) registry number.

Upon receipt of the analytical data, the EDD will be reduced into summary tables for each group of analytes (e.g., petroleum hydrocarbons, VOCs), and media. Upon completion of the summary tables, the accuracy of the data reduction will be verified using the hard copy of the data received from the laboratory. Any exceptions will be noted and corrections will be made.

ASSESSMENT AND OVERSIGHT

ASSESSMENTS AND RESPONSE ACTIONS

Assessments used during implementation of the project will include daily communication and updates during fieldwork and data quality review by the GEI PM and GEI QAO. Response actions to assessed issues will be coordinated between the GEI PM, GEI QAO, and involved subcontractors.

PROJECT REPORTS

Routine Communications

Subsequent to approval of the project Work Plan, GeoEngineers will communicate project status to the City of Bremerton Project Manager through periodic conference calls or emails. These calls will include discussion of project status and schedule, any quality assurance problems and recommended solutions, and data quality assessments.

Site-Specific Health and Safety Plans

A HASP has been prepared for the site in accordance with OSHA requirements in 29 CFR Part 1910.120 and State of Washington Industrial Safety and Health Act, WAC 296-62 (Appendix C). The HASP includes general site information including access procedures, site/waste characteristics, hazard evaluation, on-site control, personal protection, and emergency information and procedures.

GeoEngineers

Appendix C
Health and Safety Plan

APPENDIX C
HEALTH AND SAFETY PLAN

GEOENGINEERS, INC.
SITE HEALTH & SAFETY PLAN CHECKLIST
BREMERTON GAS WORKS BROWNFIELD CLEANUP PROJECT

This checklist is to be used in conjunction with the GeoEngineers' Safety program manual. Together, the program and this checklist comprise the site safety plan for this site. This plan is to be used by GeoEngineers personnel on this site. If the work entails potential exposures to other substances or unusual situations, additional safety and health information will be included and the plan will be approved by the GeoEngineers Health and Safety Manager. All plans are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Program Manual.

1.0 GENERAL PROJECT INFORMATION

Project Name:	Bremerton Gas Works Brownfield Cleanup Project – Bremerton Washington
Project Number:	00892-017-00
Type of Project:	Remedial Investigation
Start/Completion:	May 21-31, 2007
Subcontractors:	To be determined.

Liability Clause - This Site Safety Plan is intended for use by GeoEngineers Employees only. It does not extend to the other contractors or subcontractors working on this site. If requested by subcontractors, this site safety plan may be used as a minimum guideline for those entities to develop safety plans or procedures for their own staff to work under. In this case, Form C-3 shall be signed by the subcontractor.

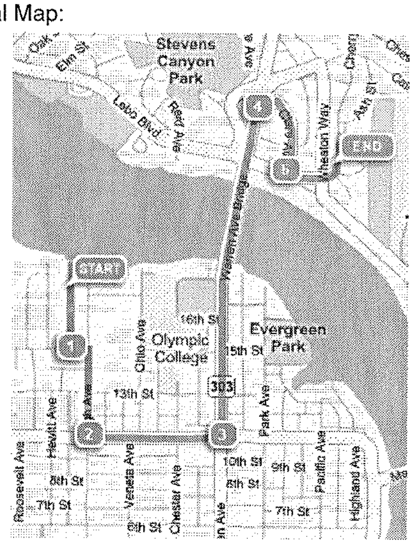
2.0 SCOPE OF WORK

The attached Work Plan covers the scope of work in detail.

3.0 PERSONNEL/CONTACT INFORMATION PHONE NUMBERS

TITLE	NAME	TELEPHONE NUMBERS
Site Safety Officer:		
Project Manager:	Sean Trimble	(206) 728-2674
Health & Safety Program Manager:	Leah Alcyon, CIH	(206) 728-2674
Field Engineer/Geologist		
Client	City of Bremerton – Dan Miller	(360) 473-2314

4.0 EMERGENCY INFORMATION

Hospital Name and Address:	Harrison Hospital 2520 Cherry Avenue, Bremerton, WA 98310 Phone: (360) 377-3911
Phone Numbers (Hospital ER):	(360) 895-6250
Starting from:	1725 Pennsylvania Avenue, Bremerton, WA
Arriving at:	2520 Cherry Avenue, Bremerton, WA
Distance:	Less than 2.6 miles
Route to Hospital: **1:** Depart Pennsylvania Ave (West) — 0.2 Mi. **2:** Turn LEFT (East) onto 15th Street and then immediately RIGHT (South) onto High Ave — 0.3 Mi. **3:** Turn LEFT (East) onto 11th Street — 0.4 Mi. **4:** Turn LEFT (North) onto SR-303 [Warren Ave] — 0.9 Mi. **5:** Keep STRAIGHT onto SR-303 — 0.5 Mi. **6:** Bear RIGHT (North) onto SR-303 — 0.0 Mi. **7:** Turn RIGHT onto Ramp — 0.0 Mi. **8:** Bear RIGHT (South-East) onto Clare Ave — 0.2 Mi. **9:** Turn LEFT (East) onto Lebo Blvd — 0.1 Mi. **10:** Road name changes to Cherry Ave — 0.0 Mi.	Hospital Map: 
Ambulance:	9-1-1
Poison Control:	1 (800) 732-6985
Police:	9-1-1
Fire:	9-1-1
Location of Nearest Telephone:	Cell phones are carried by field personnel.
Nearest Fire Extinguisher:	Located in the GEI vehicle on site.
Nearest First-Aid Kit:	Located in the GEI vehicle on site.

4.1 STANDARD EMERGENCY PROCEDURES

1. Get help -
   - send another worker to phone 911 (if necessary)
   - as soon as feasible, notify GeoEngineers' project manager
2. Reduce risk to injured person -
   - turn off equipment
   - move from injury location (if possible)
   - keep warm
   - perform CPR (if necessary)

3. Transport injured person to medical treatment facility (if necessary) -
   - by ambulance (if necessary) or GeoEngineers vehicle
   - stay with person at medical facility
   - keep GeoEngineers manager appraised of situation and notify human resources manager of situation

5.0 PERSONNELTRAINING RECORDS

Name of Employees on Site	Level of Training (24/ 40 hr)	Date of Last Training	First Aid/ CPR	Respirator Fit Test

6.0 KNOWN (OR ANTICIPATED) HAZARDS

Note: A hazard assessment will be completed at every site prior to beginning field activities. Updates will be included in the daily log. This list is a summary of hazards listed on the form.

6.1 PHYSICAL HAZARDS

Items checked below are potential activities to be used during the project.

X	Drill rigs and Concrete Coring, including working inside a warehouse
	Backhoe
	Trackhoe
	Crane
	Front End Loader
	Excavations/trenching (1:1 slopes for Type B soil)
	Shored/braced excavation if greater than 4 feet of depth
X	Overhead hazards/power lines
X	Tripping/puncture hazards (debris on-site, steep slopes or pits)
	Unusual traffic hazard – Street traffic

6.2 PHYSICAL HAZARD MITIGATION MEASURES OR PROCEDURES

- Work areas will be marked with reflective cones, barricades and/or caution tape. Personnel will wear blaze orange vests for increased visibility by vehicle and equipment operators.
- Prior to placing equipment into service, the SSO will observe an equipment safety inspection by a trained and experienced equipment operator to ensure each piece of equipment meets standard equipment safety requirements. Equipment inspection records maintained by the owner and operator of the equipment at their office facility shall be made available to GeoEngineers upon request. Only experienced, proficient equipment operators will be used to operate heavy equipment. Personnel must possess the required operators' licensing or certification.

- Field personnel will be aware constantly of the location and motion of heavy equipment. A safe distance will be maintained between personnel and the equipment. Personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. Personnel will approach operating heavy equipment only when they are certain the operator has indicated it is safe to do so.
- Heavy equipment and/or vehicles used on this site will not work within 20 feet of overhead utility lines without first ensuring that the lines are not energized. This distance may be reduced to 10 feet depending on the client and the use of a safety watch.
- Personnel entry into unshored or unsloped excavations deeper than four feet is not allowed. Any trenching and shoring requirements will follow guidelines established in WAC 296-155, the Washington State Construction standards or OSHA 1926.651 Excavation Requirements. In the event that a worker is required to enter an excavation deeper than four feet, a trench box or other acceptable shoring will be employed or the side walls of the excavation will be sloped according to the soil type and guidelines as outlined in OSHA/WISHA regulations. If the shoring/sloping deviates from that outlined in the WAC, it will be designed and stamped by a PE. Prior to entry personnel will conduct air monitoring as described later in this plan. All hazardous encumbrances and excavated material will be stockpiled at least two feet from the edge of a trench or open pit. If concentrations of volatile gases accumulate within an open trench or excavation, the means of entering shall adhere to confined space entry and air monitoring procedures outlined under the air monitoring recommendations in this plan and the GeoEngineers Safety Program Manual.
- Personnel will avoid tripping hazards, steep slopes, pit and other hazardous encumbrances. If it becomes necessary to work within 6 feet of the edge of a pit, slope, pier or other potentially hazardous area, appropriate fall protection measures will be implemented by the SSO in accordance with OSHA/WISHA regulations and the GEI Safety Program manual.
- Personnel will utilize the necessary traffic control subcontractor during drilling and groundwater monitoring field activities to maintain a safe work environment. Personnel will work with the traffic control employees to erect the necessary cones and traffic control signs/flaggers to maintain safe buffers between traffic flow and work spaces.

Engineering Controls:

_______ Trench shoring (1:1 slope for Type B Soils)

_______ Location work spaces upwind/wind direction monitoring

_______ Visqueen/other soil covers (as needed)

_______ Other (specify)______________________________________

____

6.3 CHEMICAL HAZARDS *(PRESENT AT SITE)*

Petroleum Hydrocarbons:

X	Naphthalenes or paraffins
X	Aromatic hydrocarbons (benzene, ethylbenzene, toluene, xylenes)
X	Gasoline
X	Diesel fuel
X	Waste oil

6.4 HAZARDS FROM OTHER ORGANIC COMPOUNDS *(PRESENT AT SITE)*

	Chlorinated hydrocarbons (PCE, TCE and related breakdown products).
X	PAHs (polycyclic aromatic hydrocarbons)
	Pesticides/Herbicides
	Other_______________

Known chemical characteristics (maximum/average concentrations for routine monitoring):	Soil Chemistry (mg/kg)	Water Chemistry (µg/l)
TPH-Gasoline Range	6,100	2,000
TPH-Diesel Range	200	310
Benzene	0.38	2.0
Toluene	3.4	5.0
Ethylbenzene	3.8	---
Xylenes	17	24

6.5 HEALTH HAZARDS OF VOLATILE ORGANIC COMPOUNDS

Compound/ Description	Exposure Limits/IDLHb	Exposure Routes	Toxic Characteristicsd
Gasoline	OSHA PEL: 500 ppm Short term: NA ACGIH PEL: NA	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; dizziness; dermatitis; chemical pneumonitis (aspiration liquid); in animals: kidney damage
Benzene	OSHA PEL: 1 ppm Short term: 5 ppm ACGIH PEL 0.5 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]

Compound/ Description	Exposure Limits/IDLHb	Exposure Routes	Toxic Characteristicsd
Toluene	OSHA PEL: 200 ppm Short term: 150 ppm NIOSH PEL: 100 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage
Ehtylbenzene	OSHA PEL: 100 ppm Short term: 125 ppm NIOSH PEL: 100 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma
Xylenes	OSHA PEL: 100 ppm Short term: 150 ppm NIOSH PEL: 100 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

6.6 Chemical Hazard Mitigation Measures or Procedures

Air monitoring will be conducted for flammable vapors and for establishing the level of respiratory protection.

- Half face combination organic vapor/HEPA or P100 cartridge respirators will be available on site to be used as necessary. P100 cartridges are only to be used if PID measurements are below the site action limit. P100 cartridges are used for protection against dust, metals, asbestos, while the combination organic vapor/HEPA cartridges are protective against both dust and vapor. Ensure that the PID or TLV will detect the chemicals of concern on site.
- Level D PPE will be worn at all times on site. Potentially exposed personnel will wash gloves, hands, face, and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to- mouth activities including eating, smoking, etc. Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation. Individual PELs or action limits are not expected to be exceeded given the planned activities. If conditions are dry and dust is visible during site activities, personnel will use P100 cartridges on their respirator.

6.7 Biologic Hazards

X	Poison Ivy or other vegetation	
X	Insects or snakes	
X	Used hypodermic needs or other infectious hazards	**Do not pick up or contact**
	Others	

6.8 Biologic Hazard Mitigation Measures or Procedures

Site personnel shall avoid contact with or exposures to potential biological hazards encountered.

6.9 ADDITIONAL HAZARDS *(UPDATE IN DAILY LOG)*

Include evaluation of:

- *Physical Hazards* (excavations and shoring, equipment, traffic, tripping, heat stress, cold stress and others)
- *Chemical Hazards* (odors, spills, free product, airborne particulates and others present)
- *Biologic Hazards* (snakes, spiders, other animals, discarded needles, poison ivy and others present)

7.0 LIST OF FIELD ACTIVITIES

Check the activities to be completed during the project:

X	Site reconnaissance
X	Exploratory borings
	Construction monitoring
X	Surveying
	Test pit exploration
X	Monitor well installation
X	Monitor well development
X	Soil sample collection
X	Field screening of soil samples
X	Vapor measurements
X	Groundwater sampling
X	Groundwater depth and free product measurement
	Product sample collection
	Soil stockpile testing
	Remedial excavation
	Underground storage tank removal monitoring
	Remediation system monitoring
	Recovery of free product

8.0 SITE DESCRIPTION

Address/Location:	1723 Pennsylvania Avenue, Bremerton, Kitsap County, Washington
Site topography:	Sloped
Predominant wind direction:	Unknown
Site drainage:	Unknown

X Municipal drain

X Surface water drainage – If so, direction of flow Radial

____ Engineered site drains

____ Other

Utility check complete:	To be completed prior to drilling – see documentation Utility Checklist
Traffic or vehicle access control plans:	If needed
Site access control (exclusion zone) defined by:	NA

X Fence

X Survey tape

X Traffic cones

X Traffic control barriers as required by the city during field work

Hot zone/exclusion zone: Within 10 feet of excavation AND as barricaded by the site safety officer.

8.2 Personnel Protective Equipment

Personnel Protective Equipment. Minimum level of protective equipment for these sites is Level D. After the initial and/or daily hazard assessment has been completed, select the appropriate protective gear (PPE) to preserve worker safety. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted prior to the start of site operations.

Check applicable personal protection gear to be used:

X Hardhat (if overhead hazards, or client requests)

X Steel-toed boots (if crushing hazards are a potential or if client requests)

X Safety glasses (if dust, particles, or other hazards are present or client requests)

X Hearing protection (if it is difficult to carry on a conversation 3 feet away)

X Rubber boots (if wet conditions)

Gloves (specify):

X Nitrile

____ Latex

____ Liners

____ Leather

____ Other (specify) __________

Protective clothing:

	Tyvek (if dry conditions are encountered, Tyvek is sufficient)
	Saranex (personnel shall use Saranex if liquids are handled or splash may be an issue)
X	Cotton
X	Rain gear (as needed)
X	Layered warm clothing (as needed)

Inhalation hazard protection:

X	Level D
	Level C (respirators with organic vapor filters/ P100 filters, at the discretion of site safety officer)

Limitations of Protective Clothing

PPE clothing ensembles designated for use during site activities shall be selected to provide protection against known or anticipated hazards. However, no protective garment, glove, or boot is entirely chemical-resistant, nor does any PPE provide protection against all types of hazards. To obtain optimum performance from PPE, site personnel shall be trained in the proper use and inspection of PPE. This training shall include the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures, or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears, or other signs of punctures. If the integrity of the PPE is comprised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

Respirator Selection, Use, and Maintenance

GeoEngineers has developed a written respiratory protection program in compliance with OSHA requirements contained in 29 CFR 1910.134. Site personnel shall be trained on the proper use, maintenance, and limitations of respirators. Site personnel that are required to wear respiratory protection shall be medically qualified to wear respiratory protection in accordance with 29 CFR 1910.134. Site personnel that will use a tight-fitting respirator must have passed a qualitative or quantitative fit test conducted in accordance with an OSHA-accepted fit test protocol. Fit testing must be repeated annually or whenever a new type of respirator is used.

Respirator Cartridges

If site personnel are required to wear air-purifying respirators, the appropriate cartridges shall be selected to protect personnel from known or anticipated site contaminants. The respirator/cartridge combination shall be certified and approved by NIOSH. A cartridge change out schedule shall be developed based on known site contaminants, anticipated contaminant concentrations, and data supplied by the cartridge manufacturer related to the absorption capacity of the cartridge for specific contaminants. Site personnel shall be made aware of the cartridge change out schedule prior to the initiation of site activities. Site personnel shall also be instructed to change respirator cartridges if they detect increased resistance during inhalation or detect vapor breakthrough by smell, taste, or feel although breakthrough is not an acceptable method of determining the change out schedule. At a minimum, cartridges should be changed a minimum of once daily.

Respirator Inspection and Cleaning

The Site Safety Officer shall periodically (i.e., weekly) inspect respirators at the project site. Site personnel shall inspect respirators prior to each use in accordance with the manufacturer's instructions. In addition, site personnel wearing a tight-fitting respirator shall perform a positive and negative pressure user seal check each time the respirator is donned to ensure proper fit and function. User seal checks shall be performed in accordance with the GeoEngineers respiratory protection program or the respirator manufacturer's instructions.

Respirators shall be hygienically cleaned as often as necessary to maintain the equipment in a sanitary condition. At a minimum, respirators shall be cleaned at the end of each work shift. Respirator cleaning procedures shall include an initial soap/water cleaning, a water rinse, a sanitizing soaking, and a final water rinse. One capful of bleach per one gallon of water can be used to create the sanitizing soak solution. When not in use, respirators shall be stored to protect against damage, hazardous chemicals, sunlight, dust, excessive temperatures, and excessive moisture. In addition, respirators shall be stored to prevent deformation of the face piece and exhalation valve.

Facial Hair and Corrective Lenses

Site personnel with facial hair that interferes with the sealing surface of a respirator shall not be permitted to wear respiratory protection or work in areas where respiratory protection is required. Normal eyeglasses can not be worn under full-face respirators because the temple bars interfere with the sealing surface of the respirator. Site personnel requiring corrective lenses will be provided with spectacle inserts designed for use with full-face respirators. Contact lenses should not be worn with respiratory protection.

9.0 AIR MONITORING PLAN

Work upwind if at all possible.

Check instrumentation to be used:

____ TLV Monitor (flammability only, for methane and petroleum vapors)
X PID (Photoionization Detector)
X Other (i.e., detector tubes): Optional__________

Check monitoring frequency/locations: and type (specify: work space, borehole, breathing zone):

____ 15 minutes - Continuous during soil disturbance activities or handling samples
____ 15 minutes
____ 30 minutes
X Hourly (in breathing zone during excavations, drilling, sampling)

Additional personal air monitoring for specific chemical exposure:

Action levels:

- The workspace will be monitored using a PID (photoionization detector). These instruments must be properly maintained, calibrated and charged (refer to the instrument manuals for details). Zero this meter in the same relative humidity as the area it will be used in and allow at least a ten minute warm-up prior to zeroing. Do not zero in a contaminated area. The PID can be tuned to read chemicals specifically if there are not multiple contaminants on site. Can tune to detect one chemical with response factor entered into equipment but PID picks up all Volatile Organic Compounds present. Ionization potential (IP) of chemical has to be less than lamp (11.7/ 10.6eV) and PID does not detect methane. The ppm readout on the instrument is relative to the IP of isobutylene (calibration gas) so conversion must be made in order to estimate ppm of chemical on site.

- An initial vapor measurement survey of the site should be conducted to detect "hot spots" if contaminated soil is exposed at the surface. Vapor measurement surveys of the workspace should be conducted at least hourly or more often if persistent petroleum-related odors are detected. Additionally, if vapor concentrations exceed 5 ppm above background continuously for a five minute period as measured in the breathing zone, upgrade to Level C PPE or move to a non-contaminated area.
- Standard industrial hygiene/safety procedure is to require that action be taken to reduce worker exposure to organic vapors when vapor concentrations exceed ½ the TLV. Because of the variety of chemicals, the PID will not indicate exposure to a specific PEL and is therefore not a preferred tool for determining worker exposure to chemicals. If odors are detected then employees will upgrade to respirator with Organic Vapor cartridges and will contact the Health and Safety Program Manager for other sampling options.

Air Monitoring Action Levels

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Delineation	PID	Hourly during drilling	Background to 5 parts per million (ppm) in breathing zone	Use Level D or Modified Level D PPE
Organic Vapors	Delineation	PID	Hourly during drilling	5 to 25 ppm in breathing zone	Stop work and evacuate area. Implement engineering controls if feasible.
Organic Vapors	Delineation	PID	Hourly during drilling	> 25 ppm in breathing zone	Stop work and evacuate the area. Contact CIH for guidance.
Combustible Atmosphere	Delineation	PID/TLV	Hourly during drilling	<10% LEL or <1000 ppm	Depends on contaminant. The PEL is usually exceeded before the LEL.
Combustible Atmosphere	Environmental Remedial Actions	PID/TLV Or 4 gas meter	Hourly during drilling	>10% LEL or >1000 ppm	Stop work and evacuate the site. Contact CIH for guidance.

10.0 DECONTAMINATION PROCEDURES

Minimal decontamination consists of washing soiled boots, gloves and respirator; hands and face; discarding protective clothing; and removing used respirator cartridges prior to eating, drinking or leaving the site. ***Used PPE to be placed in on-site drum.***

Specify other decontamination procedures:

____

____

11.0 WASTE DISPOSAL OR STORAGE

PPE disposal (specify): To be stored in labeled, secured drums on-site pending characterization and disposal.

Drill cutting/excavated sediment disposal or storage:

x	On-site, pending analysis and further action
x	Secured in labeled, sealed 55-gallon drums
____	Other (describe destination, responsible parties): ____________________

12.0 DOCUMENTATION EXPECTED TO BE COMPLETED

NOTE: The Field Log is to contain the following information:

Updates on hazard assessments, field decisions, conversations with subs, client or other parties

Air monitoring/calibration results; personnel, locations monitored, activity at the time of monitoring

Action level for upgrading PPE and rationale

Meteorological conditions (temperature, wind direction, speed, humidity, etc.).

Required forms:

Field Log

Health and Safety Plan acknowledgment by GEI employees (Form C-2)

Contractors Health and Safety Plan Disclaimer (Form C-3)

Conditional forms available at GeoEngineers office: Accident Report (Form C-4)

13.0 APPROVALS

1.	Plan Prepared	______________________ Signature	______________ Date
2.	Plan Approval		
		______________________ PM Signature	______________ Date
3.	Health & Safety Officer	Leah Alcyon, CIH	
		______________________ Health & Safety Program Manager	______________ Date

NOTE: The Field Log is to contain the following information:

Air monitoring calibration, results; personnel, locations monitored

Actions taken

A description of meteorological conditions (temperature, wind direction, speed, humidity, rain, snow).

FORM C-1
HEALTH AND SAFETY MEETING
BREMERTON GAS WORKS BROWNFIELD CLEANUP PROJECT

PROJECT NO. 00892-017-00

All personnel participating in this project must receive initial health and safety orientation. Thereafter, brief tailgate safety meetings as deemed necessary by the site Safety Officer.

The orientation and the tailgate safety meetings shall include a discussion of emergency response, site communications and site hazards.

Date	Topics	Attendee	Company Name	Employee Initials

FORM C-2
SITE SAFETY PLAN – GEOENGINEERS' EMPLOYEE ACKNOWLEDGMENT
BREMERTON GAS WORKS BROWNFIELD CLEANUP PROJECT

PROJECT NO. 00892-017-00

(All GeoEngineers' site workers complete this form which should remain attached to the safety plan checklist and filed with other project documentation).

I, ____, do hereby verify that a copy of the current Safety Plan has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge a full understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures. I understand that I will be informed immediately of any changes that would affect site personnel safety.

Signed ______________________ Date ________________

Range of Dates From: ______________________

To: ______________________

Signed ______________________ Date ________________

Range of Dates From: ______________________

To: ______________________

Signed ______________________ Date ________________

Range of Dates From: ______________________

To: ______________________

Signed ______________________ Date ________________

FORM C-3
SUBCONTRACTOR AND SITE VISITOR SITE SAFETY FORM
BREMERTON GAS WORKS BROWNFIELD CLEANUP PROJECT

PROJECT NO. 00892-017-00

I, ____, verify that a copy of the current site Safety Plan has been provided by GeoEngineers, Inc. to inform me of the hazardous substances on site and to provide safety procedures and protocols that will be used by GeoEngineers' staff at the site. By signing below, I agree that the safety of my employees is the responsibility of the undersigned company.

Signed ______________________________ Date ____________________

Firm: ____

Signed ______________________________ Date ____________________

Firm: ____

Signed ______________________________ Date ____________________

Firm: ____

Signed ______________________________ Date ____________________

Firm: ____

Signed ______________________________ Date ____________________

Firm: ____

Signed ______________________________ Date ____________________

Firm: ____

GeoEngineers

Appendix D
Report Limitations and Guidelines for Use

APPENDIX D
REPORT LIMITATIONS AND GUIDELINES FOR USE

This appendix provides information to help you manage your risks with respect to the use of this report.

ENVIRONMENTAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for the exclusive use of the City of Bremerton ("the City"). This report may be made available to the City's authorized agents and regulatory agencies for review. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except the City should rely on this environmental report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

THIS ENVIRONMENTAL REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

This report has been prepared for the Bremerton Gas Works Brownfield Cleanup Site located in Bremerton, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

RELIANCE CONDITIONS FOR THIRD PARTIES

Our report was prepared for the exclusive use of our Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted environmental practices in this area at the time this report was prepared.

ENVIRONMENTAL REGULATIONS ARE ALWAYS EVOLVING

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Subsurface Conditions Can Change

This environmental report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

Soil and Groundwater End Use

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other sites or for other on-site uses of the affected media (soil and/or groundwater). Note that hazardous substances may be present in some of the site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject site or reuse of the affected media on site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject site to another location or its reuse on site in instances that we were not aware of or could not control.

Most Environmental Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

GeoEngineers

Appendix E
Consent for Access to Property

CITY OF BREMERTON
THE CITY OF PRIDE AND OPPORTUNITY

PUBLIC WORKS & UTILITIES
Administration

Tel 360-473-5315
Fax 360-473-5018
3027 Olympus Driv
Bremerton, WA 983

CONSENT FOR ACCESS TO PROPERTY

Name: Ms. Natacha Sesko

Assessor Tax Parcel No: 3711-000-022-0101
Bremerton WA 98312

I consent to the City of Bremerton, its employees, and authorized representatives of the City of Bremerton entering and having continued access to my property through the Spring of 2008 for the following purposes:

X Conduct actions (e.g., mapping of surface & subsurface utility locations, topographic surveying, etc.) related to the site investigation;

X Collect surface and subsurface soil, groundwater and other environmental media samples as warranted; and

X Take photographs.

This written permission is given by me voluntarily with knowledge of my right to refuse and without threats or promises of any kind.

Signature

March 2nd 2007.
Date

PUBLIC WORKS & UTILITIES
Administration

Tel 360-473-5315
Fax 360-473-5018
3027 Olympus Drive
Bremerton, WA 9831

CONSENT FOR ACCESS TO PROPERTY

Name: Mr. & Mrs. Paul and Margaret McConkey

Assessor Tax Parcel No's: 3711-000-001-0409 & 0607
Bremerton WA 98312

I consent to officers, employees, and authorized representatives of the City of Bremerton entering and having continued access to my property through the Spring of 2008 for the following purposes:

X Conduct actions (e.g., mapping of surface & subsurface utility locations, topographic surveying, etc.) related to the site investigation;

X Collect surface soil subsurface soil, ground water and other environmental media samples as warranted; and

X Take photographs.

This written permission is given by me voluntarily with knowledge of my right to refuse and without threats or promises of any kind.

Paul McConkey 3/2/07

Signature Date

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

February 27, 2007

Reply to
Attn Of: ECL-112

Dennis Lewarch
Archaeologist
Suquamish Tribe
15838 Sandy Hook Road
Suquamish, WA 98392-0498

Dear Mr. Lewarch:

The purpose of this letter is to consult with the Suquamish Tribe for any cultural resources concern that might arise from sampling activity being undertaken by the City of Bremerton and the EPA along the Port Washington Narrows. This work will be conducted under a Brownfields Cooperative Agreement (BF-96046501-0) with the City of Bremerton and by the EPA Superfund Technical Assessment and Response Team (START) contractor.

This work entails conducting Phase II environmental site assessments at three properties located between Thompson and Pennsylvania Avenues in Bremerton, Washington (Assessor Tax Parcel # 3711-000-022-0101, 3711-000-001-0409 & 0607). EPA will also be conducting additional investigation at these properties under the Targeted Brownfields Assesseement Program. The purpose of the assessments is to identify and delineate contamination on the property. These Phase II assessments will involve the sampling of surface and sub-surface soil and groundwater. Installation of groundwater sampling wells and soil borings will disturb soil from the ground surface to the water table. This information will be used to develop the most appropriate cleanup and redevelopment strategies for the properties.

Enclosed is a figure prepared by Geoengineers that indicates the approximate location of the groundwater monitoring wells. Please let me know by April 1, 2007, if the Suquamish Tribe has any concerns about this EPA-funded project moving forward. My phone number is (206)553-2594 and my email address is labaw.joanne@epa.gov.

Sincerely,

Joanne LaBaw
Brownfield Project Manager

Enclosure

cc: Dan Miller, City of Bremerton

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

February 27, 2007

Reply to
Attn of: ECL-112

Allyson Brooks, Director &
State Historic Preservation Officer
Department of Archaeology & Historic Preservation
1063 South Capitol Way, Suite 106
Olympia WA 98501

Dear Dr. Brooks:

The purpose of this letter is to consult with the State Historic Preservation Office about environmental sampling activity being undertaken by the City of Bremerton and the EPA along the Port Washington Narrows. This work will be conducted under a Brownfields Cooperative Agreement (BF-96046501-0) with the City of Bremerton and by the EPA Superfund Technical Assessment and Response Team (START) contractor.

This work entails conducting Phase II environmental site assessments at three properties located between Thompson and Pennsylvania Avenues in Bremerton, Washington (Assessor Tax Parcel # 3711-000-022-0101, 3711-000-001-0409 & 0607). EPA will also be conducting additional investigation at these properties under the Targeted Brownfields Assessement Program. The purpose of the assessments is to identify and delineate contamination on the property. These Phase II assessments will involve the sampling of surface and sub-surface soil and groundwater. Installation of groundwater sampling wells and soil borings will disturb soil from the ground surface to the water table. This information will be used to develop the most appropriate cleanup and redevelopment strategies for the properties.

Enclosed is a figure prepared by Geoengineers that indicates the approximate location of the groundwater monitoring wells. Please let me know by April 1, 2007, if the State Historic Preservation Office has any concerns about this EPA-funded project moving forward. My phone number is (206)553-2594 and my email address is labaw.joanne@epa.gov.

Sincerely,

Joanne LaBaw
Brownfield Project Manager

Enclosure

cc: Dan Miller, City of Bremerton